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AN ANALYSIS OF DEPOT MAINTENANCE
INTERSERVICING SOURCE OF REPAIR
SELECTION AND ACQUISITION
PROGRAM INCOMPATIBILITIES

THESIS

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**AN ANALYSIS OF DEPOT MAINTENANCE INTERSERVICING
SOURCE OF REPAIR SELECTION AND ACQUISITION
PROGRAM INCOMPATIBILITIES**

THESIS

**Presented to the Faculty of the School of Systems and
Logistics of the Air Force Institute of Technology**

Air University

**In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management**

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Robert N. McGarry and Gregory K. Owens

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Abstract

This study revealed that although the Depot Maintenance Interservicing (DMI) study process has the potential for considerable savings in the Depot Source of Repair (DSOR) decision it has failed to do so. The DMI study process and the acquisition programs are well established. However, there are various incompatibilities between the two which interfere with the interaction between them and prevent a timely decision.

We performed an examination of the DMI study process and its impact on six acquisition programs which have either undergone or are presently undergoing the study process. The results of personal interviews with program office and Joint Depot Maintenance Analysis Group (JDMAG) personnel are summarized to provide an indepth view of these incompatibilities.

We identified the causes and cures, and also made other observations about the DMI and acquisition process. Finally, we made recommendations and suggestions for future research in this area.

AN ANALYSIS OF DEPOT MAINTENANCE INTERSERVICING SOURCE OF REPAIR SELECTION AND ACQUISITION PROGRAM INCOMPATIBILITIES

I. Introduction

General Issue

As a result of the end of the Cold War and subsequent breakup of the Communist Bloc in Europe in 1992, the Department of Defense (DoD) is faced with drastic budget reductions, and must take every opportunity to save money. The supply system now has over \$32 billion in secondary item (spares and repair parts, consumable supplies, provisions and clothing) inventory on hand; a tremendous increase over the \$11 billion held in September 1980. The very magnitude of this figure has brought our inventory under close scrutiny(9:2). The repair cost of these secondary items is considerable, \$12.5 billion in FY89 (6:2).

Each military department has one or more "Logistics Commanders" who are responsible for the acquisition of equipment and for life cycle support, including depot maintenance. These Joint Logistics Commanders (JLC) recognized the need and the opportunity for increased interservice cooperation in a broad range of acquisition and logistics functions including depot maintenance.

In the case of depot maintenance, the JLC establish common policies which are then reflected in individual

service regulations. One principal objective of these policies is the sharing of resources when it's effective and economical to do so, commonly referred to as "interservicing" (6:47).

The Joint Depot Maintenance Analysis Group (JDMAG) was created to facilitate Depot Maintenance Interservicing (DMI). It performs master planning, policy development and assessment, and promotes interservicing by conducting analyses and studies with the objective of utilizing the combined depot resources of the services to establish and maintain the minimum peacetime base required in support of mobilization and to avoid unnecessary duplication of depot maintenance capability (8:10).

Through implementation of the DMI concept, DoD has realized a significant cost savings in depot repair. For example, through FY88, the cumulative potential cost avoidances (expenses avoided because of an action taken) resulting from DMI decisions totaled more than \$510 million(6:2).

Despite these savings, actual DMI expenditures are relatively small in comparison to the overall depot maintenance budget. In the FY89 depot maintenance budget, interservicing expenditures were \$304.2 million, while the total budget was \$12.5 billion. This represents only 2.43 percent of the budget(6:2). In FY90, the percentage declined significantly. Of a \$12.9 billion total depot

budget, only \$220.6 million, or 1.7 percent, went to depot interservicing(7:3).

Initial questioning of weapon system acquisition and JDMAG personnel revealed difficulties in the transfer of information between organizations. These difficulties lead to delays in the completion of DMI recommendation studies and can potentially impact acquisition decisions made by the Program Management Office (PMO).

Problem Statement

The DMI recommendation study process and weapon system program acquisition schedules are incompatible for the timely establishment of organic depot maintenance capability.

Research Questions

1. How long does it take to perform a DMI recommendation study?
2. What information is needed to perform a DMI recommendation study?
3. Where does the information needed to perform a DMI recommendation study come from?
4. What factors hinder the performance of the DMI decision process?
5. What factors expedite the performance of the DMI decision process?
6. Of the information needed for a DMI recommendation, which is the hardest to obtain? Why?
7. Of the information needed for a DMI recommendation, which is the easiest to obtain? Why?
8. When is the information available to support the DMI recommendation process?

9. When is that information being provided to JDMAG to support the DMI recommendation process?
10. When is the Program Management Office(PMO) provided the results from the DMI study?
11. When the PMO is provided the DMI study results, are they forced to change decisions/schedules that could not wait?
12. What impact do the DMI study results have on the overall acquisition process (i.e. cost, schedule, performance, quality)?

Scope

This study will focus on the DMI recommendation process. Specifically, we will examine the exchange of necessary information between Program Management Offices and JDMAG prior to, during, and after the recommendation process. We will only address the DMI recommendation up to, but excluding, the final depot source-of-repair (DSOR) decision. That decision is made/approved by the Joint Policy Coordination Group for DMI (JPCG-DMI). We will not address the final DSOR decision in this study. The variables involved in the final decision are very extensive and go beyond the scope of this research.

Definition of Terms

For the convenience of the reader of this thesis, we have included a glossary of the terms which can be found in Appendix A.

II. Literature Review

Chapter Overview

The purpose of this chapter is to present the information obtained through a search of published literature pertaining to Depot Maintenance Interservicing (DMI), depot maintenance, joint service, and reparable.

Depot Maintenance Interservicing (DMI)

The Joint Depot Maintenance Analysis Group (JDMAG) conducts studies of items requiring depot maintenance support to ensure effective utilization of the Services' depot maintenance resources. These studies serve to prevent the acquisition of unwarranted duplicate depot maintenance capabilities, while sustaining essential mission support needs (8:10).

The Joint Service DMI regulation requires that prior to assignment of depot maintenance responsibility, each weapon system, equipment end item, system, subsystem, component, or commodity group undergo a mandatory DMI review if it meets at least one of the following criteria:

- New system equipment acquisitions or modification programs requiring depot maintenance (DM) support.
- System or equipment depot repair programs being planned for transition from contract support to organic support, or organic support to contract support.
- Existing system or equipment for which an expansion in depot-level capability requires an additional depot capital investment of \$100,000 or more.

- Jointly used or managed system or equipment planned for introduction into the DOD inventory for which depot maintenance support is required.
- Proposed or planned realignment of DM workloads which affect published DMI decisions or DMI studies currently under way. This review criterion is applicable to intraservice changes or additions for existing DMI decisions if the \$100,000 or more capital investment requirement is met.
- Items repaired on contract will be considered by the contracting service for DMI support upon expiration/termination of contract and prior to contract renewal. Time must be allowed prior to contract expiration termination to permit the DMI assessment to be completed and documented. (6:55)

All system/equipment acquisitions requiring depot maintenance support will be identified early in the acquisition process as potential candidates for interservice support. Additionally, systems/equipment in the existing inventory meeting the necessary criteria, will be identified in the early planning stages as candidates. Any item meeting at least one of the criteria will be assessed for DMI potential. Items identified for interservice review will be subjected to varying levels and scopes of assessment. The assessment will result in a DMI decision letter by the appropriate Service(s), designating the site or sites authorized to provide depot maintenance (1:21).

Four types of DMI reviews are presently involved in this process. These types are summarized as follows, and are shown graphically in Figure 1:

Contract Set-Aside (Directed Contract): Workloads for which a decision to assign depot maintenance to commercial sources has been made by higher authority as

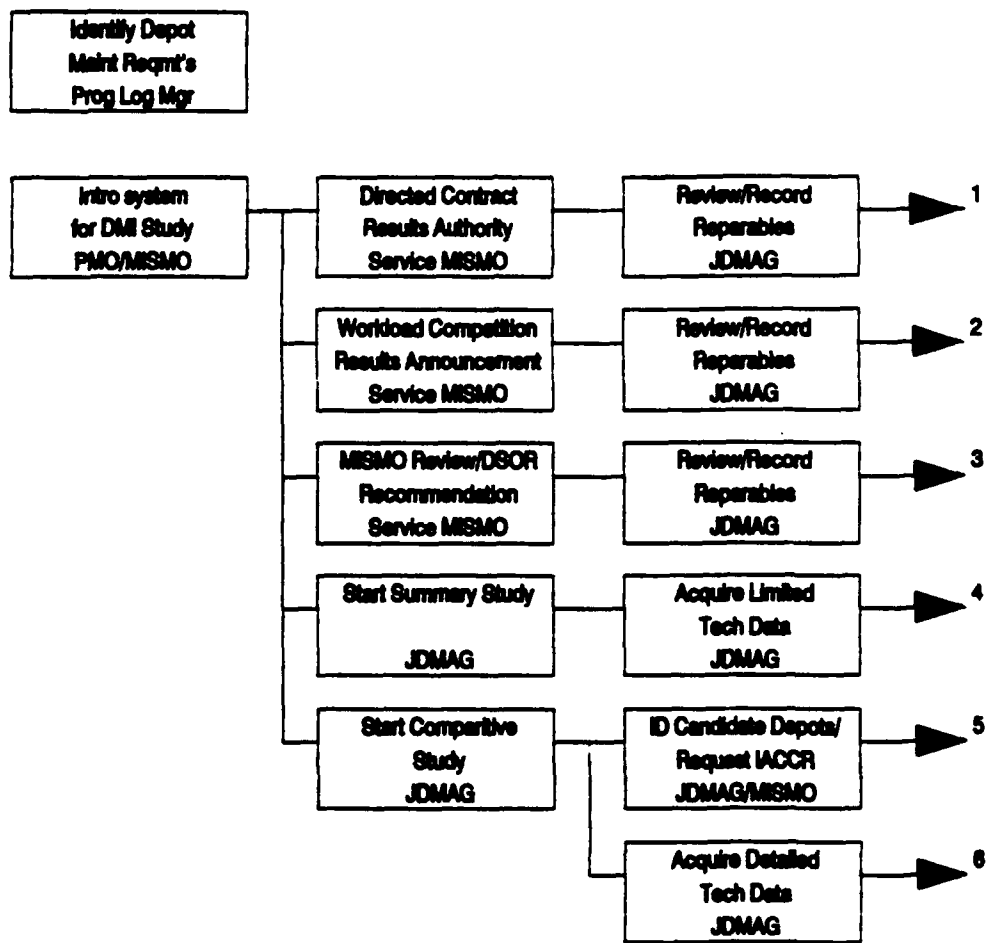


Figure 1. DMI Recommendation Study Flow Chart (1 of 3)

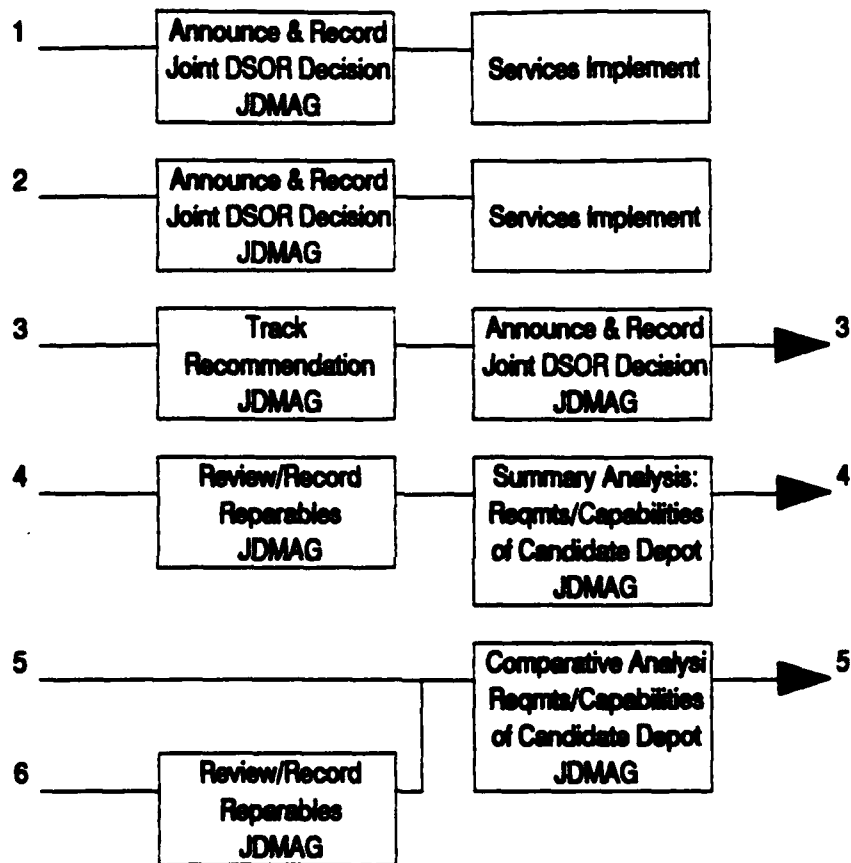


Figure 1. DMI Recommendation Study Flow Chart (2 of 3)

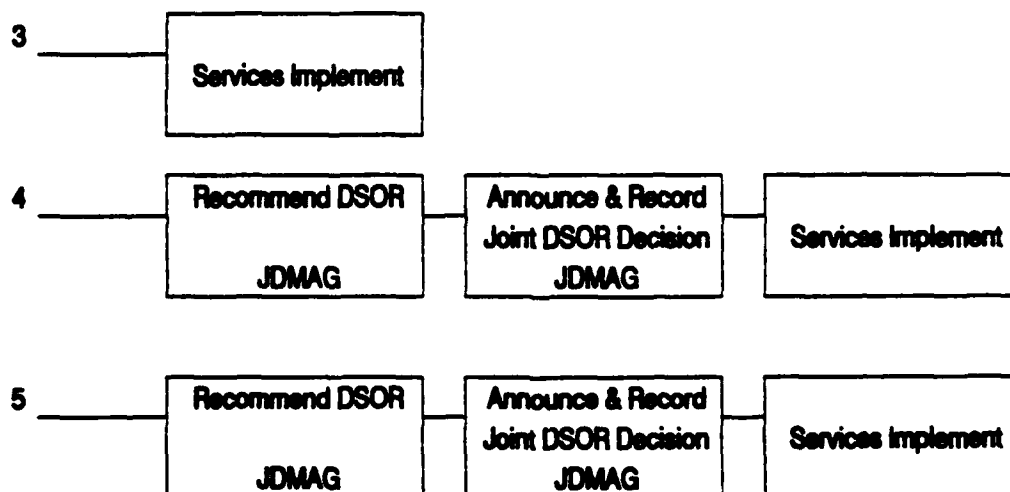


Figure 1. DMI Recommendation Study Flow Chart (3 of 3)

a matter of Service policy. Such workloads are documented by the individual Services and submitted to JDMAG for recording and announcement.

Service Workload Competition: A Service may conduct a full and open workload competition among available sources of repair both commercial and organic. The results of this competition are submitted to the JDMAG for recording and announcement.

Maintenance Interservice Support Management Office (MISMO) Review: If there is no benefit to be gained by a joint analysis of the item, the introducing (acquiring) service may submit the results of its review and assignment recommendation to the other Service MISMOs. Upon the concurrence of the other Services, the JDMAG will record and announce the decision.

DMI Candidate Analysis: Workloads which are not identified for contract set aside, Service workload competition, or MISMO review are subjected to an analysis by JDMAG for potential interservice depot assignment. These items are submitted by the acquiring Service to JDMAG. JDMAG may utilize either a short summary level analysis or a longer comparative analysis in developing a depot source-of-repair recommendation.

The summary analysis is used for low-volume workload, single user, low cost to facilitate items or those items where the depot assignment is obvious based on current capabilities or other considerations. This approach minimizes the documentation required from the acquisition manager, requires fewer in-house resources, and generally results in a quicker study.

The comparative analysis is a more in-depth examination of DMI candidate workloads and is used when costs to facilitate are high, there are multiple users, or there is a significant workload impact. This study methodology provides a basis for comparison of organic depot facility, equipment, and training costs to determine which depots are capable of performing the work among multiple candidate depots. The results of both the summary and comparative analyses are submitted by JDMAG to the Services for their review. JDMAG records the joint decision upon the receipt of all Services' concurrences. (5:1)

Depot Source of Repair Request Flow Process

Figure 2 illustrates the Depot Source of Repair Request Flow Process. The following discussion will reference

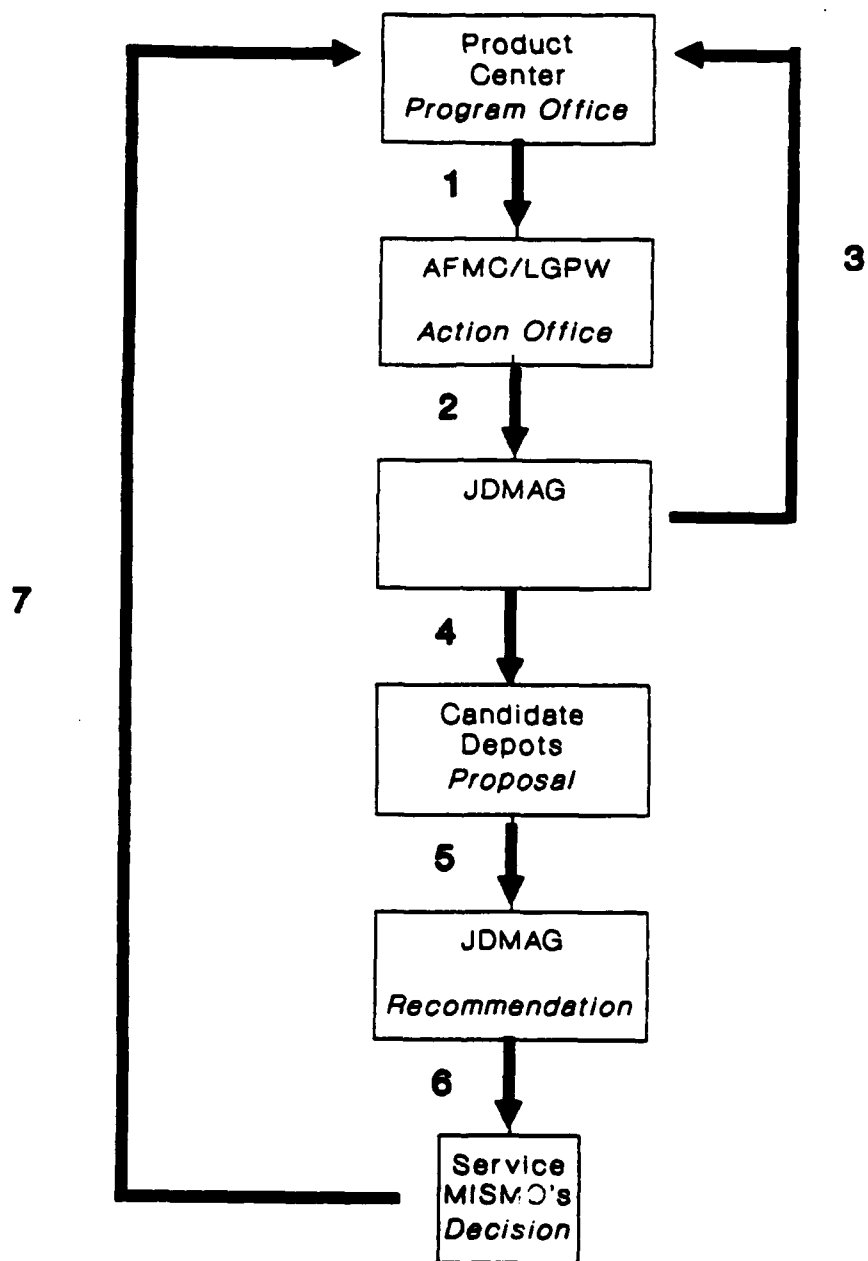


Figure 2. Depot Source of Repair Request Flow Process

Figure 2 and use of numbers (1-7) to identify the various critical points within the request process. The entire process begins with the identification of DMI Candidates. This identification is done through the submission of:

- a. JLC Form 27, DMI Candidate Information.
- b. JLC Form 44, Rationale for Organic or Commercial Repair of New or Postured Item.

Samples of these forms can be found in Appendix C.

The Program Office provides the data to a designated action office (1). In the case of the USAF, and all of the programs used for our study, the action office was AFMC/LGPW. The action office then forwards the data package to JDMAG(2).

After the introductory package (JLC Forms 27 and 44) are received by JDMAG, a communication link is established between the program office and JDMAG (3). The System Program Office is responsible for providing program and technical data necessary to support the study. They are responsible for completing the required data forms and for providing other data in a time frame compatible with the negotiated DMI milestones. The program and technical data package normally includes, but is not limited to, the information below (samples of each form can be found in Appendix C):

- a. JLC Form 28, Depot Repairable Item List.
- b. JLC Form 29, Depot Technical Publications/Engineering Drawings and Schematics.

- c. JLC Form 30, New/Peculiar Depot Support Equipment Requirements.
- d. JLC Form 31, Projected Depot Workload (Peacetime).
- e. JLC Form 32, Projected Depot Workload (Mobilization).
- f. Technical Data identified on the JLC Form 29.

This communication link between JDMAG and the Program Office remains very active until the data and technical drawings reach a level adequate for the candidate depots to analyze the depot repair requirements of the program and develop a responsive proposal.

The entire program information and technical data package is then provided to the candidate depots (4) as the basis for the preparation of their Industrial Activity Capability and Capacity Response (IACCR) packages. The candidate depots forward their IACCR proposal packages to JDMAG (5). This package consists of the following forms (examples in Appendix C):

- a. JLC Form 33, Industrial Activity Capability and Capacity Response.
- b. JLC Form 34, Summary Capability/Costs.
- c. JLC Form 35, Common Support Equipment Requirements.
- d. JLC Form 36, Peculiar Support Equipment Requirements.
- e. JLC Form 37, Industrial/Additional Plant Equipment Requirements.
- f. JLC Form 38, Facility Alteration/Construction Requirements.
- g. JLC Form 39, Existing Repair Capability.

- h. JLC Form 40, Manhour Requirements/Workload Projection (Peacetime).
- i. JLC Form 41, Manhour Requirements/Workload Projection Summary (Peacetime).
- j. JLC Form 43 Projected Workload (Mobilization).

JDMAG then uses the information provided by the candidate depots to perform their analyses and determine the best site or sites for organic maintenance to be performed. Their recommendation for assignment of the depot source of repair is then submitted to the service MISMOs for review (6). The MISMOs must reach unanimous agreement to constitute a decision. After reaching a consensus, JDMAG will announce the Service's decision and the appropriate MISMOs will announce the decision to the affected command(s)(7) for implementation (1:30). The program office initiates any necessary technology transfer, equipment purchases, and provisioning of funds to activate the depot source of repair.

Where DMI is being implemented, there are some success stories. However, some cases fall short of their full potential due to poor management control as evidenced in the following Naval Audit Service report.

The Navy Ships Parts Control Center (SPCC) is the Navy's inventory control point for ships' parts. Part of the SPCC's mission involves managing the depot-level repair of parts returned from the fleet, including parts repaired by interservice repair facilities through Depot Maintenance Interservice Support Agreements. The interservice facilities include Army, Air Force, and Marine Corps facilities as well as Naval Air Systems Command activities. The audit service estimated that there was \$127 million in SPCC-managed

material at interservice repair facilities during Fiscal Year 1989. SPCC generally performed adequate evaluations to determine whether organic, commercial, or interservice repair would be most cost effective before initiating those repairs. In one instance, the Navy decided to have inertial measurement units repaired commercially rather than at the Aerospace Guidance and Metrology Center (AGMC), Newark Air Force Station, Newark, Ohio. This occurred because Navy personnel thought it would be more cost effective. However, a potential cost avoidance of \$840,000 can be achieved by having future work done at Newark. SPCC did not have accurate visibility and accountability for depot-level reparable that were in the possession of interservice repair facilities. This generally occurred because of limited computer capability and inaccurate status reports. This can result in the Navy not knowing what material is available for use, and a \$826,000 potential cost avoidance can be achieved by properly listing materiel. (10:2)

Depot Maintenance

The Navy also identified, in a lessons learned paper, problems in establishing timely organic depot maintenance. The paper described how organic maintenance was delayed due to late procurement of tools, equipment, and training. The paper also stated that Navy depots are not involved in the early material acquisition process so their requirements and recommendations were not available in the decision-making process that led to organic depot maintenance support. This delayed the organic depot maintenance support and required additional funds for extended contractor support (11:1).

When the depots are not involved in the early development of the Depot Maintenance Work Request, there is little or no visibility of Depot Plant Maintenance Equipment (DPME), Automated Test Equipment (ATE), special tools, special processes, special procedures, and training required to support depot maintenance.

Without this early information the depots cannot identify funding for DPME, training, etc. This causes a delay in establishing depot maintenance support of the system and requires the costly extension of Interim Contractor Logistics Support (ICLS) (12:1). This problem of involvement is also critical to the DMI process. All system/equipment acquisitions requiring depot maintenance support will be identified early in the acquisition process as potential candidates for interservice support. Additionally, systems/equipment in the existing inventory must be identified in the early planning stages as DMI candidates (8:13).

Joint Service

Depot Maintenance is big business and represents support of programs totalling well in excess of \$370 billion.

The Military Services share the primary defense mission of manning, equipping, training, and maintaining the readiness of the forces necessary to provide national security. In order to carry out this mission, the Services have acquired a large quantity and variety of equipment including over 20,000 aircraft, 36,000 combat vehicles, 4,500 ground-launch vehicles, 660,000 wheeled vehicles, 575 ships, and 1,400 watercraft as well as detection, communication, and command/control equipment. According to the DOD FY87 Real and Personal Property Report, the total investment in operational equipment within the Department of Defense is over \$374 billion. (6:2)

These huge expenditures for this equipment demand an extremely high level of attention from the maintenance community.

Reparables

In some cases, depot level repair capability is never established. This can easily lead to a loss of inventory control over assets which have been identified as reparable. For example,

a General Accounting Office (GAO) Audit Report on three Army Inventory Control Points (ICPs), covering the period between June and November 1989, identified 815 reparable items with "buys in process" valued at \$216.8 million and with unserviceable assets on hand. GAO randomly selected and analyzed 140 of these items and found that for 36 items, the item managers could have reduced procurements by repairing the unserviceable assets instead of buying new ones. On the basis of its sample results, GAO estimated, with a 95-percent confidence level, that the Army could have saved between \$21.1 million and \$35.9 million for the 815 items by repairing assets rather than buying them (4:3).

Summary and Analysis

We conducted an extensive literature search of the Defense Technical Information Center, Defense Logistics Studies Information Exchange, the Air Force Institute of Technology Library, as well as other related defense logistics journals and publications. Our search revealed very little written documentation addressing depot maintenance interservicing. In addition, we discovered no evidence of previous research being done. Some of the articles we did review emphasized the magnitude of Service force size and complex combat plans. These plans indicated an increased reliance on other services for support and sustainability. These articles also explained how the management of these numerous assets is very difficult, if not impossible. In addition, the General Accounting Office (GAO) study showed how mismanagement of assets can result in a

significant increase in maintenance and logistics supportability costs.

We believe when these articles are considered collectively, they support the notion of an acquisition-depot planning "disconnect". This generally occurs between the program offices and JDMAG during the coordination and cooperation phases of the organic depot maintenance source of repair decision recommendation process.

Although we have no previous research to build upon, we believe these articles identify symptoms that support our problem statement--the DMI recommendation process and weapon system program acquisition milestones are incompatible for timely establishment of organic depot maintenance capability.

III. Methodology

Chapter Overview

This chapter discusses our research methodology. We begin by explaining the two phases of the research project. Following the phases, we present a review of methodology literature, and a description of the population and sample.

Explanation

This research consisted of two phases: (1) The selection of programs to query; and (2) the performance of semi-structured interviews.

We examined two types of programs (ongoing and completed) in an effort to identify problems associated with depot maintenance planning. We expected program managers in completed programs to give a historical perspective on the time-frame, coordination, and pitfalls encountered in performing the DMI study. Ongoing programs (those currently being considered for DSOR) related "real-time" issues concerning the DMI process.

In order to gain the best insight into the competitive bidding aspect of the DMI recommendation process, we focused only on the comparative study analysis described in Chapter II.

The JDMAG office provided a list of ongoing and completed programs to use for this study. We chose the following ongoing programs: ALR-56M, C-17, and Improved Data

Modem (IDM). Completed programs used were: Advanced Medium Range Air-to-air Missile (AMRAAM), AN/ALE-47, and Joint Tactical Information Distribution System (JTIDS).

Although our study concentrated primarily on Air Force acquisition programs (most were managed at Wright-Patterson Air Force Base), we feel that the results represent the acquisition process at most DoD program offices. We based our assumption on the fact that all DoD programs are required to use the Joint Regulation for Depot Maintenance Interservicing (ref 1)(2:7A4).

The semi-structured interviews were conducted with personnel in the Program Management Offices and JDMAG, who are, or were, involved with the DMI recommendation of the above selected programs. Two of the programs evaluated, the AMRAAM and JTIDS, were located off-station. In those cases, we initially contacted the program offices by telephone, then followed up by sending the point-of-contact a copy of the questions previously identified in Chapter Two. We then made follow up phone calls to ensure the interviewees understood the questions, as well as to clarify any questions they had. Afterwards, the interviewees sent us their responses by mail or facsimile.

Once the programs were selected, we contacted the Program Management Offices to select personnel within the division to be interviewed. Our objective was to interview a total of 18 program office personnel (see Table 1).

Table 1. Program Selection Interview Matrix

Type	Support Equipment	Subsystem	Weapon System	Total
On-going	3	3	3	9
Completed	3	3	3	9
Total	6	6	6	18

Our expectation of interviewing 18 personnel from the program offices was high. We actually interviewed a total of 11 personnel. However, we believe these people adequately represented each of the programs selected. We discovered there are actually only one or two people involved in the DMI process in any given program. Also, we found that the size of the program did not have any bearing on the number of personnel assigned to the depot support planning function.

In addition, we interviewed personnel from the JDMAG Depot Maintenance Analysis division that were involved in the selected programs.

We provided each interviewee with an advanced copy of interview questions. We did this to ensure a more detailed response to each question during the interview process, as well as prepare the interviewee for follow-up discussion, if needed.

Review of Literature Applying to Methodology

The research consisted of two phases: (1) The selection of programs to query; and (2) The performance of semi-structured interviews.

We used the judgmental type of nonprobability sampling technique to select our programs for this research project. We chose this "hand-picked" method in order to ensure our sample would conform to our criteria of: 1) Located at Wright-Patterson AFB, OH; 2) On-going or completed; and 3) Classified as support equipment, a subsystem for a major system, or a weapon system. This technique provides visibility to current DMI studies, yet conforms to current time and fiscal resource constraints to perform this study (3:273).

In order to obtain the depth and detail necessary to identify possible time incompatibilities, we used the face-to-face semi-structured interview technique, except for those programs located off-station from Wright-Patterson AFB. In those cases, we used the same interview questions, but received the responses by mail. These techniques allowed us to probe with additional questions and gather supplemental information through observation (3:320).

Description of Population and Sample

For the purpose of this research, the population consisted of all acquisition and logistics support activities planning for, requiring, or providing depot

maintenance support. A more detailed explanation of these types of program can be found in Chapter II, under the sub-heading Depot Maintenance Interservicing. Our sample consisted of a selection of ongoing and completed programs. To further differentiate these programs, we subdivided them into three areas according to system classification. We examined support equipment (e.g. automated test station, voltmeters, etc.), subsystems used to support a major system (e.g. avionics suite, landing gear, etc.), and a weapon system (e.g. an aircraft).

IV. Findings and Analysis

Preface

This chapter contains these three sections: Interview Questions Summary, Problem Identification, and Conclusions. As stated in Chapter One, it is not our intention to present a detailed discussion of the DSOR decision process which is done by senior officers at the JPCG-DMI level after JDMAG submits its recommendation. Although this decision-making process is crucial in making a final SOR determination, and may be based on issues outside the realm of the DMI recommendation process, it is beyond the scope of this paper.

The Interview Question Summary consists of a synopsis of responses from both program office personnel and the JDMAG recommendation study representatives.

In the Problem Identification section, we discuss areas which the interviewees identified as contributors to the delay in selecting a depot repair facility. We also include impressions of any problem areas noted or discussed with the interviewees.

The problem areas are summarized and conclusions drawn regarding areas that seem to hinder the recommendation process most often.

Interview Questions

1. How long does it take to perform a DMI recommendation study?

Based on interviews, we found the average timeframe to complete a DMI recommendation study ranges between 18 to 24 months. The C-17 program had three of its sub-systems take between 10-24 months. On the other hand, the JTIDS program took 10 years to complete.

Differences in the individual programs led to the large variations in the study completion time. For example, the three sub-systems of the C-17 (IFF, OBIGGS, and the engine) were similar to other systems which already had previously established depot maintenance capability. This means that a depot repair center already had the personnel, facilities, support equipment, and test equipment to support the new repair workload with a minimum of training and expenditures on new equipment and facilities.

JTIDS was a unique system which used new, state-of-the-art technology and design architecture. As a result of this "uniqueness", coupled with its complexity, the program office and the contractors were not able to reach a stable configuration baseline until approximately the ninth year of development. Therefore, the program office could not submit its technical data package to JDMAG for consideration. In addition, since the system was using new technology, there was little probability of finding a depot repair center which had the necessary maintenance capability established. Once the data package was received, it took the JDMAG approximately 12 months to complete their study.

The majority of the programs we studied seemed to have experienced the same results. The more complex or unique a system is, the longer it seems to take to get the recommendation study complete.

2. What information is needed to perform a DMI recommendation study?

The standard forms required are listed in Chapter Two, under the section entitled Depot Source of Repair Request Flow Process. However, as the DMI regulation states, the data requirement may be tailored depending on the needs of the bidding depot candidates. During our interview with JDMAG, one representative stated, "We must have enough technical 'specificity' to allow candidate depots to determine repair methods and equipment as well as testing requirements. Ultimately, it is the candidate depots who decide whether or not the data is adequate enough to determine what will be required to establish repair capability, in terms of equipment, personnel, facilities, parts, and procedures."

According to both the program offices and the JDMAG office, a significant amount of the information needed to complete a DMI study package can be derived from the Logistics Support Analysis (LSA) database. One JDMAG representative felt if the data was available through the LSA process, it could be easily converted to fulfill their needs. However, as mentioned earlier, it takes a considerable amount of time for the contractor and program

logistics manager to reach an acceptable baseline configuration. In the meantime, program logistics managers stated that the contractors are hesitant to load preliminary information into the LSA database which may require further development and/or design revisions.

There are other means to keep the recommendation process flowing, even with the lack of all of the data specified in the Logistics DMI regulation. For example, the C-17 and ALE-47 program offices held several meetings with JDMAG personnel and were able to successfully reach compromises which allowed substitute data to be used in lieu of very expensive technical drawings. The established rapport between the program offices and JDMAG undoubtedly led to better cooperation and understanding of each other's needs and processes. We will address this issue further in Question 5 of this section in the discussion of what helped to expedite the DMI study process.

3. Where does the information needed to perform a DMI recommendation study come from?

The majority of this data comes from the contractor in the form of Support Equipment Requirements Document (SERDs), technical drawings, Test Requirements Document (TRDs), and Logistics Support Analysis (LSA) data inputs. In addition, the program offices provide the workload computations and identify the required maintenance/logistics concepts needed

to support the new system during both peacetime and combat environments.

This data is not developed into a useable or finalized format until well into the Engineering and Manufacturing Development phase of the acquisition cycle. Meanwhile, the program offices rely on the contractor to provide Interim Contractor Support (ICS) of the weapon system until an organic capability can be established.

The contractor's ICS repair data is normally not good enough for depot repair use. JDMAG personnel we interviewed told us that, "The acceptance test procedures the contractors use are so generic that they may not even 'play' on the Service's test equipment. These procedures are generally designed to test go/no go conditions and have minimum fault-detection or fault-isolation capability. Therefore, the procedures and test equipment cannot be used for troubleshooting or overhaul testing."

4. What factors hinder the performance of the DMI decision process?

Every program office and JDMAG representative responded that the primary factor that hinders the DMI recommendation process was the availability of technical data from the prime contractors.

There were different opinions regarding why this data was not available. For example, the C-17 office stated, "Data development for new systems takes longer to develop,

and once submitted, it is more difficult to baseline this data against systems and support structures that are already in place. Also, the contractors were initially receptive to our requests for (bits and pieces of additional) data. However, after additional requests, they (contractors) wanted more money." On the other hand, the JTIDS logistics manager told us, "The differences in intermediate and depot level support equipment between the Services played a key role in their (bid) submittal." At the time the logistics manager was preparing his data package for submittal, each Service had begun to develop a standardized test equipment program within their respective service. The Air Force was developing Modular Automatic Test Equipment (MATE). The Navy was developing Consolidated Automated Support System (CASS), and the Army was developing Integrated Family of Test Equipment (IFTE). These standard architectures do not support each other, but are being used today by the owning service. Since the DSOR decision is not made upfront in the acquisition process, it makes it very difficult for the contractor to design/develop SERDs that will work with any service's equipment.

The remaining programs we interviewed agreed that there is a delay in technical data delivery. Both program logistics managers and JDMAG personnel believe the reason for the delay can be attributed to incomplete or inadequate contracting actions. According to the JDMAG representative studying the C-17 program, "Contract delivery dates for data

do not coincide with the need date for the study to begin. Program logistics managers need to plan ahead to get the data when needed."

Of the three ongoing programs used in this study, two of them (ALR-56 and IDM) are currently awaiting data delivery before the DMI study can proceed. Both logistics managers acknowledge that this delay was due to late contracting for the necessary SERDs and TRD information. The ALR-56 logistics manager said, "The lack of the DMI decision has put the ALR-56 program in jeopardy of losing its \$22.1 million in depot funding, if it isn't obligated by October 1992." The IDM program is being forced to extend its ICS contract while awaiting data delivery. It is only fair to state that, in both cases, the program logistics managers only recently took over their programs, therefore, "inheriting" these problems.

Our interviews revealed that personnel turnover in the program offices is another key factor that hinders the DMI study process. For example, according to the ALR-56 logistics manager, his program had, "...four different logistics managers and a change of JDMAG action officers in the last three years." We also discovered that as these programs mature and begin being supported by the services, the program logistics managers move on to other programs or positions. Additionally, military personnel assigned in Air Force Specialty Codes (AFSCs), other than acquisition or

logistics, move periodically as a result of reassignment to different bases.

We believe the lack of training also hinders the DMI recommendation process. Currently, the program logistics managers seem to be learning the process as they go through it. In the case of the ALE-47 program, the logistics manager had approximately eight years of acquisition/logistics experience working in the Aeronautical Systems Center, but had no knowledge of the DMI recommendation process. The JDMAG representative who studied this program felt that this experience, "... significantly improved the overall effectiveness and quality of the data package that was submitted." However, the program office had to establish direct contact with the JDMAG representative to find out what was needed to initiate the process. Other program offices did not know what was needed either. It appears there is little or no DMI study process training in any of the Professional Continuing Education (PCE) courses offered at the Air Force Institute of Technology (AFIT) or other service schools.

There is also a significant difference in perspectives between program office personnel and JDMAG personnel. Each office seems to have a short-sighted view of what is needed to accomplish the overall objective of establishing weapons system depot maintenance support. In addition, neither office seems to have much understanding and/or empathy for their counterpart's problems related to system development.

For example, the program offices tended to ignore or delay the depot support planning in favor of achieving their acquisition milestone schedule. The emphasis seems to be putting "rubber on the ramp", not downstream support. On the other hand, JDMAG's mentality seems to focus on the delivery of technical data. There doesn't seem to be much flexibility towards the program offices using alternative methods of delivering information. According to the C-17 program office, when they offered JDMAG access to their weapon system's computer database (including installation of a terminal at the JDMAG office to improve availability and timeliness of data), they declined the offer. When we questioned a JDMAG representative about using alternative forms of data, he stated, "JDMAG would be willing to accept floppy disks of data, as long as it was 'tailored' to their needs." He did seem reluctant to use a terminal to download information and extract what is needed. JDMAG's reason for not using these alternatives was based on a lack of available resources (manpower, training, and space).

5. What factors expedite the performance of the DMI decision process?

Several factors enabled both the program offices and JDMAG to expedite the DMI recommendation study process. These factors include establishing and maintaining a good rapport between program office and JDMAG personnel, early contracting of data requirements from the contractors, a

commitment to achieve a DSOR regardless of service, and contracting for personnel to prepare the entire data package.

Our study revealed that the programs which established a good rapport with the JDMAG office inevitably had fewer problems accomplishing the DMI recommendation study. This rapport was established by having face-to-face meetings with JDMAG and maintaining close communication channels, exercised regularly to solve problems or clarify issues.

Our research indicates program logistics managers, who had problems with late delivery of technical data realized that earlier contracting of the data requirements probably would have minimized, or possibly eliminated, the delay time in the DMI study process. Program logistics managers reflected the frustration experienced when forced to expedite the data delivery. For example, more times than not, they had to pay more for the expedited delivery, and usually received a lesser quality product than expected.

The majority of programs studied appeared to be possessive regarding awarding depot workload to their own Service. However, the C-17 and joint programs, such as JTIDS and AMRAAM, were totally committed and unbiased toward the DSOR selection. During one interview with JDMAG, he cited the Global Positioning System (GPS) as a model program in terms of commitment and cooperation between Services. Each service sent maintenance planning representatives to logistics support and Depot Maintenance Activation Working

Group (DMAWG) meetings in order to better understand the workload requirements, as well as facility and equipment needs. In doing so, the services were much better prepared to submit their bids for DMI competition.

Another unique management technique used by the GPS and C-17 program offices is to contract someone to oversee the entire depot maintenance planning process, beginning with the data package preparation for DMI consideration. According to JDMAG, this process worked well for the GPS program, and is also working well for the C-17. In both cases, JDMAG noted that they received quality data packages to either forward to candidate depots, or make summary decisions.

6. Of the information needed for a DMI recommendation, which is the hardest to obtain? Why?

A majority of program offices stated the hardest information to obtain was technical data, manuals, TRDs, and level 3 drawings. These areas were also identified in Question 4, when we discussed those areas that most hinder the DMI study process.

Technical data and manuals, such as technical orders and detailed troubleshooting documentation generally isn't finalized until the system has successfully completed the Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA). Once these audits are satisfactorily completed, the contractor and program office

have, in essence, agreed to a product baseline. This is usually the time that the contractors will prepare the technical documentation required by the contract, such as the test requirement documentation (TRDs) and the level 3 drawings (detailed drawings which can be used to remanufacture the entire item or any portion of it).

7. Of the information needed for a DMI recommendation, which is the easiest to obtain? Why?

Every program office responded that the weapon system introductory data package and workload projection data were easiest to obtain and submit. The program logistics managers feel their experience in the logistics and maintenance fields enables them to easily make accurate forecasts of the information requested. In addition, the computations are much easier if the new system is similar to one already fielded and supported. In addition, the fact that the program office has control of the data collection and input needed to complete the introductory package and workload planning forecasts, makes it easier to complete the required package with minimal outside help.

One JDMAG representative stated, "The facility requirements were easiest to obtain." He based this assumption on the ease of predicting the physical plant size needed to repair the system. Generally, these estimates are based on a similar system that the contractor has developed previously.

8. When is the information available to support the DMI recommendation process?

This question brought out a sharp contrast in responses, both within the program offices and from the JDMAG office. First, the program offices believe that, in order to receive accurate technical data which can be used to establish depot capability, they have to wait until FCA, PCA, or Critical Design Review (CDR). These events do not occur until late in the Engineering and Manufacturing Development (EMD) phase of the acquisition process. Therefore, delivery of the data by the contractor will "slow down", or may delay, the DMI decision process.

The program offices also believe that the requirement for more technical data is continuous, because, in their opinion, JDMAG believes what the program offices does provide is not accurate enough.

Most of the JDMAG interviewees stated, "It is the responsibility of the program office to know when they have the necessary data and information needed to support the candidate depot's bid and the decision process."

When asked about these conflicting viewpoints, a senior JDMAG representative stated that, "Ultimately, it is the responding candidate depots who determine whether or not the data is accurate and complete enough to make a reasonable bid on the workload."

9. When is that information being provided to JDMAG to support the DMI recommendation process?

The predominant response to this question was that the program offices submitted their data to the JDMAG office in a piecemeal fashion. However, the program logistics managers continue to send the remaining data in as it becomes available. As a rule, JDMAG will not send out the data package to the candidate depots until it is complete. Therefore, the decision process of every program has the potential for being delayed for an undetermined amount of time. This situation also makes establishing any standardized timeframe or schedule to perform a DMI study virtually impossible.

The C-17 program made an earnest attempt to get their DMI decision as quickly as possible, to avoid losing depot funding for procurement of support equipment, technical orders, etc. The program office originally submitted data for 23 sub-systems, and is still awaiting DMI decisions on 20. During the interview, the C-17 logistics manager stated, "Unfortunately, our ambitious schedule (for DMI recommendation) hasn't really worked out for us. We are still submitting data to JDMAG to meet the minimum data requirements; seven years after the initial introduction to our system." Although the program was introduced to JDMAG in 1985, the program office has only been sending technical data to JDMAG since 1990.

10. When is the Program Management Office(PMO) provided the results from the DMI study?

As previously discussed in Chapter 2, the DMI decision is a two-part process. First after JDMAG receives the candidate depot bids, they make a recommendation to the service MISMOs for their evaluation and selection. Once, all four services concur, the service MISMO representing the Service to receive the workload will notify the appropriate program office.

Of the six programs we studied, only three have fully completed the DMI decision process. Of the three, the JTIDS program received their results in the least amount of time--approximately three months after submittal. This quick turn-around was due, in part, to the joint services close coordination and participation mentioned previously. The AMRAAM program received their notification toward the latter part of EMD or the beginning of early production. The three studies that have been completed on the C-17 program took between 10 months to two years.

11. When the PMO is provided the DMI study results, are they forced to change decisions/schedules that could not wait?

The JTIDS program experienced schedule delays while awaiting the DSOR decision from the MISMOs. The logistics manager stated, "Prior to the DMI decision, there really is no agency with a vested interest in studying the repair aspects of the system in detail. On a joint program, it is

difficult to get the resource commitment from any of the competing depots to attend meetings or work program issues."

The ALE-47 logistics manager did not feel she had to make any changes to decisions/schedules, because she had planned/anticipated that the workload would be awarded to the Air Force from the beginning. The final DSOR decision selected the Air Force.

JDMAG personnel had no response to this question, because the decision is transparent to them. JDMAG has little interface with the program offices after the recommendation is forwarded to the MISMOs.

12. What impact do the DMI study results have on the overall acquisition process (i.e. cost, schedule, performance, quality)?

JTIDS stated that if they had received a decision earlier, they may have avoided some of the program slippage, through a strong depot representation.

The ALE-47 logistics manager stated, "We didn't experience any program impact because the depots were familiar with similar systems which were already fielded."

Problem Identification and Discussion

This section contains a detailed discussion of those areas/issues that the interviewees felt contributed most to the timing incompatibilities between program schedules and the DMI recommendation study process. In addition, we have

included areas we believe to be contributors based on impressions we derived during the interview process.

Problem 1: Long recommendation studies may cause the loss of depot funding.

Depot funding for a program can be "pulled and transferred" to another program if the acquiring program office has not obligated those funds within the timeframe established. Our research indicated that most programs, especially the large, complex systems, which use new technology, tend to take longer to develop the necessary technical data needed to perform a DMI study. This situation can also affect programs which are similar in design to ones already fielded, as identified by the ALR-56 program office.

When it becomes apparent that an acquisition program consists of complex, leading edge technology, the program office must take this in consideration when establishing needs dates for depot funding. In other words, a program office should not request funding too early. Doing so may put them in jeopardy of losing it because the depot repair site has not been determined, and may not be for some time.

The fact that a DSOR decision has not been made does not prohibit the program office from taking actions to obligate depot funding rather than risk losing it. The C-17 program told us, "If the money is going to run out, adequate information is available to the System Program Office (SPO)

and contract action (to procure depot level support equipment) can be taken. The SPO will have to make a selection on where organic support is to be placed and procure the necessary elements. If a decision is made by JDMAG sometime later that does not support the location chosen by the program office, chances are JDMAG's recommendation will have no impact. This is true because funding has already been allocated, resources identified and validated, and the procurement action (i.e. manufacture of equipment, writing of technical manuals, etc.) is already underway. It would be difficult and very costly to change decisions at this point." It appears to us, in this case, the program office depot decisions can have more of an influence on the JDMAG's DMI recommendation and MISMO's DSOR decision than the other way around.

Problem 2: Program logistics managers feel that JDMAG has a lack of appreciation for the amount of work and time contractors and program offices take to produce and acquire useable technical data. This data is required by the candidate depots to complete and submit a bid package for the DMI recommendation study.

Based on our interviews with program office personnel, it appears that JDMAG does not understand how long it takes to design, develop, and produce a new weapon system and its related documentation (i.e. drawings, manuals, etc.) in a configuration that is acceptable to formulate a baseline. The interviews also indicated the belief that JDMAG is not

familiar with the procedures required for the contracting and receipt of this technical data.

JDMAG personnel are separated from the program offices by design, to eliminate any Service influence on their depot recommendation. Therefore, they must make a conscious effort to establish and maintain a close communication link with their respective weapon system counterpart. This will help to eliminate the potential for animosity.

Problem 3: Program logistics managers are unaware of, or do not understand, the recommendation study process/requirement.

There is a lack of understanding as to how and when the program office needs to submit their program for DMI study considerations. This seems to stem from the fact that there is no standardized procedure or checklist to ensure timely and accurate completion of the required data package submittal.

In almost every case, the program logistics managers acknowledged they were unaware of the need to initiate a DMI data package to get the DMI recommendation study started. The logistics managers did not become aware of the need for a study until they began the preparation to establish organic depot repair capability. Also, they were not aware of what type and magnitude of data was needed to perform the study, until receiving a letter from JDMAG identifying the required documentation. In fact, one JDMAG representative stated, "In many cases the program logistics managers are

'surprised' when they find out about the requirement to do the DMI study."

There is no set procedure or agency to oversee the submittal and track the DMI study process. Since the acquisition and logistics support regulations are published and available, JDMAG believes the Services are aware of and will "follow the DMI regs" and submit the data as specified. In reality, the programs are driven by program funding, not necessarily timeliness. Therefore, the initial time, money, and effort is spent on putting "rubber on the ramp", not planning for depot support. It appears that it is not until the program office faces the threat of losing depot funding that the DMI study process is given a higher priority in terms of handling and coordination. This would indicate a need for training which addresses this crucial element of the logistics planning process.

Problem 4: There appears to be a lack of a common goal between the program offices and JDMAG.

The management philosophies within the program offices and JDMAG are extremely parochial. The program office's charter is to put the weapon system into the hands of the user as soon as possible. As a result, logistics support tends to become a secondary concern. In the case of JDMAG, they are rarely receptive to using alternative data. Instead, JDMAG pushes for "complete" data packages based on the desires of the candidate depots--regardless of the extra

time and effort that may be needed to develop that level of detail, or if it will significantly contribute to the overall recommendation process. In our opinion, these opposing views detract from a timely, and perhaps, optimal recommendation.

Problem 5: There is no standardization of the technical data requirements between depot candidates.

According to JDMAG, the depots have the prerogative to determine whether or not the data package is sufficient enough to enable them to submit their workload bid package. JDMAG calls this "tailoring" the data package. Most of the program logistics managers feel like the data requirements list is ever-expanding--not tailored, and that JDMAG is reacting to the whims of the depots. A senior JDMAG representative told us, "In some cases, JDMAG could have completed the study earlier, with lesser data, and got the same results." JDMAG does not have engineers on their staff to analyze the technical data for accuracy and applicability. This puts them at the mercy of the candidate depots, forfeiting their control of the program, until this controversy is resolved.

Problem 6: Useable data to make DMI decision is not available until late in the EMD phase of the acquisition cycle.

DODI 5000.2 states that the DSOR decision will be accomplished or a time-phased action plan for reaching that

decision will be developed prior to completion of EMD and approval to start Milestone 3 (Production approval) (2:7-A-2-4). Any delay in receiving the technical data from the developing contractor has a direct impact on a timely submittal of the technical data package to the JDMAG.

According to the C-17 logistics manager, "The JLC Form 44 requires a workload computation that the Air Logistics Center cannot provide until provisioning of an item is completed and the responsible item management activity has been assigned. Our (C-17) contract structure dictates that identification of depot tasks and requirements is the last aspect of LSA our contractor will tackle, which is still another two and one-half years away." This means that each program logistics manager must "guesstimate" what they believe the appropriate workload will be. Of those program offices interviewed, we generally found the program logistics managers contacted their respective depot repair centers for assistance in formulating these figures. Also, the logistics managers based these computations on what they believed were similar systems already in use in the field. Since these estimates are not based on the actual system being developed, the accuracy of the figures is highly suspect.

Problem 7: There appears to a persistent rivalry between services regarding distribution of depot workload.

During our interviews with JDMAG, more than one representative expressed opinions that the program logistics

managers were, "...reluctant to share or forfeit depot workload to another Service, even if that Service is better qualified to do the job." According to JDMAG, "The larger the workload, and the more it involves leading-edge technology, the stronger the rivalry becomes." In our opinion, this rivalry stems from the budget reductions and subsequent manpower reductions. Competition between the depots is becoming more and more fierce. Each depot appears to be fighting for its very own survival. As a result, depots have focused their workload capability to support state-of-the-art technology systems in an effort to ensure their longevity over the next few decades. Conversely, depots have a tendency not to bid on standard, "run-of-the-mill" programs which generally represent short-term workloads.

The JLC Forms needed for the DMI study must be completed accurately, in order to allow the JDMAG to receive reasonable bid offers from the candidate depots. To aid in accomplishing these forms, program logistics managers routinely contact their Service depots for assistance in calculating manpower and workload cost projections. This dialogue with the depot also aids the program logistics manager in making acquisition decisions such as system design, supportability, spare part quantities, etc. However, directly contacting their respective depot counterparts can easily give the impression of favoritism and may give the bidding depot candidate representing that

Service an unfair advantage, in terms of system design and depot maintenance support requirements. In fact, one JDMAG representative told us, "The candidate depots accused the ALE-47 program office of 'playing favorites' with Warner-Robins Air Logistics Center, prior to the DSOR decision." He also said, "These allegations were unfounded, and in fact, the logistics manager was merely trying to get the best information possible to help speed up the DSOR decision process."

Observations

This section details observations made during our research. In our opinion, these points do not directly lend themselves to the timing incompatibilities between the acquisition schedule and the DMI study process. However, we believe they are closely related to the subject area, and deserve attention.

1. Although computer models exist to provide direction, such as the Computer Supported Network Analysis System (CSNAS), these models are not being used to help steer the acquisition flow-plan. During our interviews with the program offices, one respondent said, "He does not have the time to research and implement these program tools." When asked about the CSNAS model, he said, "The CSNAS model is cumbersome and not user friendly." He suggested using

Microsoft PROJECT to plot charts and milestones, which his office uses.

2. We found it interesting that everything listed as a hinderance to the DMI process seemed to be technical in nature. For example, developing and receiving technical drawings and manuals, the lack of standardized contractual procedures and/or requirements, and the level of technology involved slowed down, or in some cases, stopped the study process. On the other hand, everything that the interviewees thought expedited the process seemed to be behavioral in nature. Personal actions, such as establishing rapport, aggressive oversight, and seeking alternative solutions to problems enabled the process to proceed more smoothly.

3. The Maintenance Interservice Support Officer (MISO) is the focal point between the Services and the Service MISMO. One JDMAG representative stated, "The MISOs have been in their positions for a long time. They are there to help the Program Office by answering questions, filling out forms and keep the ball rolling. In some cases or locations, the person in this position is not really active. But, in other cases, he/she is the person to go to get problems resolved."

4. During our interviews, JDMAG stated, "Program managers feel that allocated depot funding belongs to the Service

submitting the package. If another Service was awarded the workload, that service would have to provide its own funding to support it. In reality, the program offices are responsible for funding the establishment of depot repair regardless of which service is selected." In some cases, our interviews with program managers revealed statements which supported JDMAG's comments. Program offices with this perspective tend to support their own service in terms of final DMI recommendation, even if another service may be better qualified and equipped to perform the repair.

5. Contract preparation does not consider the DMI study recommendation process in terms of data requirements and subsequent availability. In the case of leading-edge technology, data availability may come further down stream. This leads us to question whether it is better to decide on a DSOR early and live with the decision, or possibly hinder the program with a decision delay.

6. It appears the Service depots only want to compete for high technology, new work loads and long-term work. For example, the C-17 logistics manager told us, "We had difficulty getting any depots to compete as candidates to repair the On-Board Inertial Gas Generating System (OBIGGS). This system represents a small workload using fairly well-established technology and procedures. Even the Army, who

repairs a similar system, called On-Board Oxygen Gas Generating System (OBOGGS) declined to bid."

7. The demand for high technical level data at such an early point in the development of some programs drives the program office to "fudge" the data package in lieu of continuing ICS. For example, the ALE-47 logistics manager and the respective JDMAG representative reached a compromise regarding the level of data (i.e. level 2 drawings) to send out to the candidate depots. In this case, that data was sufficient for the depots to submit their bid packages, and a DSOR decision was reached.

8. The management philosophies within the program offices and JDMAG are extremely parochial. The program office's charter is to put the weapon system into the hands of the user as soon as possible. As a result logistics support tends to become a secondary concern, until either funding for ICS or depot activation is in jeopardy. Therefore, program offices routinely plan for extended ICS as opposed to accomplishing organic depot repair. This seems to indicate that their emphasis is on acquisition without regard for long-term supportability.

JDMAG is not necessarily concerned with the acquisition schedule, but more interested in receiving a sufficient level of data--regardless of the length of time needed to develop and deliver it. JDMAG believes they need this level

of data to enable the candidate depot(s) to prepare and submit their workload bid.

9. During our interviews with the program logistics managers, several of them said, "The contractors are reluctant to develop/release TRD and SERD data needed to develop organic capability, because this would mean loss of ICS contract support." In other words, once we develop the capability to repair our assets "in-house", we become less reliant on the contractor to support our systems.

10. Interviews with several of the program offices indicated that they could, and in one case did, invest money in their Service depot before the DSOR decision in anticipation of the workload. In our opinion, this is "risky business" because another depot may get the workload. If this happens, the money was misspent and may not be recovered.

Conclusions

The following comments are derived conclusions from the interviews and observations discussed in previous sections:

There is a lack of understanding as to how and when the program office needs to submit their program for DMI study considerations. This seems to stem from the fact that there is no standardized procedure or check-off to ensure timely

and accurate completion of the required data package submittal.

Although there are organizational responsibilities identified in the Logistics Depot Maintenance Interservice regulation, there does not seem to be a "watch dog" to oversee the entire process. From the program acquisition perspective, depot support is not a major concern until late in the acquisition schedule, or the possibility of losing depot funding becomes an issue. The JDMAG office is primarily concerned with receiving adequate technical data which will enable prospective candidate depots to bid on the workload. The MISMOs do not appear to be actively involved in the process, until it is time to make the final DSOR decision. In addition, it seems the MISOs only render assistance to the program office when the logistics managers request it. In most cases, we found that the MISMO and the MISO remove themselves from the communication loop by allowing the program offices to work directly with the JDMAG office. We believe this lack of oversight and guidance encourages confusion and/or miscommunication and contributes in the incompatibilities cited in this paper.

In our opinion, the use of military personnel with AFSCs other than logistics and acquisition also contributes to the incompatibility issue. These personnel are generally inexperienced in the acquisition and depot activation processes. According to JDMAG representatives, this lack of experience is reflected in ill-prepared data packages

submitted for the DMI study process. In addition, the military personnel are subject to reassignment to another duty station approximately every three to four years. Generally speaking, it takes them this long to attain a level of "corporate knowledge" in their assigned duty position.

Regardless of the specialty code program office and JDMAG personnel have, there is no established training program which focuses on the DMI study process. Both military and civilian personnel from the program offices attend Professional Continuing Education (PCE) courses to learn more about the acquisition process. However, based on discussions with two PCE course instructors who teach the LSA process and depot maintenance planning, little, if any, of the course time is devoted to the DMI study. JDMAG personnel attend a limited amount of PCE courses, which are generally focused on depot planning and activation. Therefore, they are not fully aware of the vast amount of regulatory guidance or the complexities associated with developing, contracting, and delivering the technical data needed by the depots.

Another issue which supports our findings is the lack of standardization of technical data submitted for the DMI study process. Contractors are required to gather and provide data to the government in accordance with specific military standards. However, in some cases, when this data is provided to the candidate depots for bidding, they notify

JDMAG that it is not sufficient for making a submittal. According to JDMAG, the problem with the data may be either format or level of detail. JDMAG then attempts to obtain and provide the data the particular depot says it needs. According to JDMAG, "We go back to the program office to get the level of data requested, and notify all candidates of this action. Once we receive the data, we provide it to all the candidates. This helps us to ensure a level playing field among the bidders."

The reduction of funding for all branches of Service increases the potential for force downsizing and closing of repair facilities. As a result, Service rivalry has intensified. This is particularly true in the area of competition for depot workloading. The Services are interested in obtaining and securing long-term, state-of-the-art workloads to assure their depots stay active and in business. In our opinion, as future programs are submitted for DMI study, it is highly probable each Service will submit a bid package, making management and control of the DMI process even more important.

Our research indicated that the level of technical data needed by the depot candidates to submit a workload bid is not available until late in the acquisition process (Milestone 3). In the interim, the program offices usually plan for an ICS contract to support their system until the technical data is developed and delivered. These ICS contracts can be very expensive. Rapidly changing

technology will continue to affect this situation in the future. JDMAG and the program offices agree that new technology using highly complex software, such as test program sets, will take even longer to develop. In addition, some programs may be classified as proprietary data, and may never be released to the government. These factors significantly reduce our ability to establish depot capability. Therefore, program offices must closely monitor the program development to include software program configuration.

On July 1, 1992, Air Force Logistics Command (AFLC) and Air Force Systems Command (AFSC) merged to form Air Force Materiel Command (AFMC). This merger was performed to improve the overall acquisition process and subsequent logistics management support of weapon systems. AFMC uses a concept known as Integrated Weapon System Management (IWSM) to aid in keeping the Air Force flying and fighting. Prior to the merger, AFLC and AFSC had separate mission objectives. AFSC developed the systems while AFLC provided the life-cycle support. With IWSM, a single program manager is responsible for the weapon system throughout its life-cycle--commonly referred to as the "cradle to grave" approach. IWSM will broaden the program logistics manager's perspective to include long-range supportability of the system. We believe this shift in management responsibility and focus will help strengthen the program office's concern and commitment toward the development of depot support

capability. The IWSM concept should improve the DMI study process as well. For example, program logistics managers will no longer be unaware of, or unconcerned about the DMI recommendation process, because they are equally responsible for developing long-term supportability as well as designing and procuring the new weapon system. The new program office responsibilities will also bring the goals of the program office closer to those of JDMAG.

V. Recommendations

Preface

This chapter is comprised of the following sections: Suggestions and Recommendations and Further Study. The comments made in these sections are based purely on the areas discussed in the previous four chapters of this research paper.

The Suggestions and Recommendations section consists of, what we believe are needed changes that should be made to improve the overall DSOR decision process. In terms of applicability, the changes we suggest range from within a specific organization (i.e. JDMAG and the program office) to DoD-wide implementation.

The Further Study section contains areas that we have identified as requiring additional research to further investigate the problems associated with DMI and the DSOR decision process.

Suggestions and Recommendations

In our opinion, Depot Maintenance Interservicing is a vitally important program in terms of attempting to select the most economical DSOR, and minimize or eliminate duplication of maintenance capability. However, the DMI study process requires some changes in both the organizational structure and the procedures/directives written to implement the program. These changes can be

grouped into one of three categories: (1) Changes made to emulate programs which have established a record of success; (2) Moderate changes to existing policies/procedures; and (3) Major changes, which affect DoD-wide policies/procedures.

We noted three cases where procedures implemented by the program office were very helpful in making the DMI study process more effective. In the first case, we found that Joint Service programs, such as JTIDS, AMRAAM, and GPS seemed to experience a smoother DMI study as opposed to individual programs. According to JDMAG, these joint programs were totally committed and unbiased toward the DSOR selection. Each Service sent a maintenance planning representative to the logistics support and Depot Maintenance Activation Working Group (DMAWG) meetings in order to gain a better understanding of the workload requirements, as well as the facility and equipment needs. Sending these representatives enabled the Services to be better prepared when submitting their bids for DMI competition. It appears that total involvement by depot planning representatives early in the acquisition and development of a weapon system provides greater insight into necessary logistics requirements. We recommend that all acquisition programs push for candidate depot representation at logistics planning conferences/meetings as early as practical. This should be done regardless of which depot facility the MISMOS may select during the final DSOR

decision process. We believe this is especially important for Joint Service programs. Furthermore, a selfless attitude will benefit all the Services in the long run--regardless of which depot gets the workload.

The management technique used by the GPS and C-17 program offices in obtaining a contractor to oversee the entire depot maintenance planning process has been very successful. JDMAG representatives felt this technique is instrumental in creating a more qualitative study and, in the case of the GPS, a better overall DSOR decision. The typical program logistics manager has a tremendous amount of work to do in support of his/her program. This taxing workload limits the amount of time the logistics managers can devote to collecting and submitting their data package to JDMAG. As a result, the data package received by JDMAG is usually inadequate to support the DMI study. Placing the oversight of the depot support planning on contract ensures management continuity, attention to detail, and higher quality data packages for JDMAG's process. Therefore, whenever the workload warrants and size of the program allows (i.e. joint programs or weapon systems), the work should be contracted out.

One final management technique that deserves across-the-board implementation is to breakdown large weapon systems into multiple studies whenever possible. The C-17 program initially submitted their introductory package to JDMAG expecting them to perform a study on the whole system.

It wasn't very long before they realized the amount of paperwork involved with keeping the entire system under one study. They subsequently broke the program down into 23 separate studies. Each of these studies corresponds to one of the major systems of the aircraft (e.g. hydraulic/pneumatics, UHF communications, etc.). The breakdown eased the management of the DMI study process and, as of now, three of the 23 studies are complete. The others are being handled and prioritized by the program office as the development of the C-17 progresses.

We also suggest moderate changes be made to current procedures involving the education and familiarization of the DMI process.

There are no specific PCE training courses available on the DMI recommendation study process and the DSOR decision process. Furthermore, many personnel are not fortunate enough to benefit from the training offered through PCE courses. Unfortunately, it is impossible to send everyone to these courses. As stated previously, the program logistics managers seem to be learning about the process as they are exposed to it. This even proved to be true for a program logistics manager who had received an in-depth education through PCE and had approximately eight years of acquisition/logistics experience working in Aeronautical Systems Center. During our interview, she told us she had no knowledge of the DMI recommendation process until she had to submit the data package for her program. Fortunately,

her aggressive attitude helped her to overcome this education shortfall. The DMI recommendation study and the DSOR decision are essential elements in selecting a depot repair location. However, it appears there is little or no training that address the DMI study process in any of the Professional Continuing Education (PCE) courses offered at the Air Force Institute of Technology (AFIT) or through any Service schools. We suggest that an extensive effort be initiated to integrate these areas into the existing curriculums and that research be started to determine where this education should be directed.

We recommend that only qualified individuals be placed in the program logistics manger positions in the program offices. The Air Force's Acquisition Professional Development Program is a move in this direction. However, it is unrealistic to think and hope that everyone will get trained eventually. Inexperienced individuals making decisions concerning long-range logistics plans can be very costly, and may impact the program immediately and for many years into the life of the program. Military personnel are reassigned approximately every three to four years. By the time these program logistics managers attain a level of "corporate knowledge", they have already made decisions that will affect the program for years to come. In this case, we cannot expect an individual to perform his duties correctly when he/she does not know how to do them, or worse yet, doesn't even realize that the task has to be done. It is

imperative that these individuals have enough knowledge to do their jobs.

As previously stated, we suggest that large programs hire a contractor to monitor the overall depot planning process. We also suggest that the JDMAG case worker get more involved with the program development whenever possible. We understand and agree that a 'purple suit' approach is essential to the DMI recommendation study process. However, the purpose of the study is to find and select the most cost effective DSOR possible. In many cases, JDMAG personnel may have a better idea of what is needed to assemble the data package than the program logistics manager. We believe establishing a team effort by integrating JDMAG into the program office would expedite the process. By using their experience with the depots, JDMAG personnel can help program offices obtain the appropriate level of data need to complete a DMI study in less time. On large programs, this time savings may be instrumental in reducing the overall cost of the program support.

One final area we suggest be considered involves major changes in the DoD philosophy of the overall DMI process. Either JDMAG should be given the authority and responsibility to make the DSOR decisions at the completion of their DMI study, or the MISMOs should be allowed to make an arbitrary DSOR decision during the Demonstration and Validation phase of the acquisition process, and then live with it.

In our opinion, the DMI study process has a strong potential for realizing great savings within the DoD. In fact, every program office we interviewed supported the program and felt JDMAG's objectives were very important. However, under the present policy, the JDMAG recommendation is merely a background study which the MISMOs consider when making their DSOR decision. Throughout this study, we noted that a tremendous amount of effort and investment goes into the performance of the DMI Study. The end result of the study should identify the most cost effective DSOR. However, once the MISMOs receive the recommendation from JDMAG, they have the latitude and authority to select and award the workload to a different depot--regardless of the DMI Study recommendation.

We recommend the JDMAG organization become part of the staff of the Under Secretary of Defense for Acquisition (USD(A)). Through his authority, the JDMAG DMI recommendation study would, in essence, become the DSOR decision, unless the MISMOs can justify to the USD(A) why the DSOR decision should be placed elsewhere. We recognize that in order for this to take place, JDMAG would require more personnel, particularly an engineering staff to assist in quality interpretation of data packages. Otherwise, the present staff appears quite capable of making sound decisions. We believe this organizational restructuring would compensate for the lack of authority JDMAG has now,

and therefore would help to improve the overall DMI Study process.

An alternative to the proposal discussed in the previous paragraph would be to deactivate the JDMAG and allow the MISMOs to make the DSOR decision up-front in the program acquisition process (i.e. Demonstration and Validation phase). Choosing this alternative enables the program office to develop depot repair capability for a particular depot facility much earlier than it does now. Also, in this scenario, there would not be a delay in the DSOR decision and the program logistics managers would know where to direct efforts from the beginning. The length of time ICS is used could also be minimized, or perhaps eliminated, by making the DSOR decision up-front. In addition, organic depot repair capability could be planned and phased into the program along with other milestones. As a result, the logistics planning efforts would be focused and timely.

Currently, the DMI process is not reaching its full potential benefits. It appears we are only realizing a minor cost savings when the potential exists to achieve a considerable savings. By selecting either of the two alternatives listed above, we can move closer to realizing these savings.

Further Study

Throughout the course of our research, four areas came

to our attention which we believe warrant further investigation. The impact of these areas to our study was significant enough to mention here, but time limitations prohibited us from exploring them further.

We have already suggested the implementation of training courses through the AFIT PCE program to expand the knowledge of the DMI study process and the DSOR decision process. Therefore, a study should be done on the applicability, extent and feasibility of this type of education/training.

Next, it seemed obvious to us that as the program acquisition schedules are set, the timeframe allocated for a DSOR decision occurs too early--especially in the case of high technology development. In most every case, an adequate level of data needed to make a DSOR decision will not be ready until close to Production approval. If the DMI study process remains as is, then a study should be made to determine the 'best time' for the process to begin in order to minimize delays.

Another area which had a significant influence in at least one of the programs we researched was the three different type of standardized intermediate test equipment. Each of the three Services uses its own standardized architecture, including hardware, software, and computer language. These differences significantly impair our ability to 'interservice.' In order for the DoD to become interdependent this development of "service peculiar"

technology must end. Knowing what test equipment will be used is crucial to the developing contractor during the acquisition process. Follow-on discussions with JDMAG after the interview process revealed that the Services are considering using CASS as the DoD standard for automatic test equipment. We recommend a feasibility study be done on designing and procuring one "standardized" set of test equipment to be used by all Services.

The final area we suggest for further research is the lack of DSOR decision or organic support consideration during the acquisition contracting process. It was quite apparent in our research that little, if any, attention was given to support of a weapon system when it is initially being contracted. Of course, basic supportability was considered, but technical drawings and data necessary to develop depot-level repair was not included in the contract. Program logistic managers inevitably must scramble, beg, and plead to obtain needed data that should have been contracted for initially. It is questionable whether or not these requirements are even known to the contracting officer. Therefore, a study should be made to determine if a standard "boiler plate" for technical data requirements would be beneficial to the overall acquisition/DMI process.

Appendix A: Glossary of Terms

Automatic Test Equipment: Electronic devices that automatically generate and independently furnish program stimuli; measure selected parameters of an electronic, mechanical, or electro-mechanical item; and make comparisons to accept or reject the measured values according to predetermined limits.

Candidate Depot: An organic/contract depot level maintenance support facility/activity designated by the individual Services as candidate source to provide depot level maintenance in the area of the system/equipment undergoing DMI analysis (8:22).

Capability: Availability of resources such as facilities, tools, test equipment, drawings, technical publications, trained maintenance personnel, engineering support, and spare parts required to carry out maintenance (1:E-26).

Capacity: A quantitative measure of maintenance capability usually expressed as the amount of direct labor man-hours which can be applied within a specific industrial shop, or other entity, during a forty-hour week(one shift,five days) (1:E-26).

Contract Maintenance: Any depot-level maintenance performed under contract by commercial organizations, including original manufacturers(1:E-26).

Depot Maintenance: Maintenance, performed by designated maintenance activities, which requires more extensive shop facilities and equipment and personnel of higher technical skill than those which are available at the lower levels of maintenance (1:E-26).

Depot Maintenance Interservicing (DMI): Depot maintenance, recurring or nonrecurring, performed by the organic capability of one military service, or element thereof, in support of another military service or element thereof (6:49).

Depot Maintenance Interservice Support Agreement (DMISA): An agreement whereby a Service (the Agent) accomplishes depot-level maintenance work for another Service (the Principal) (1:E-26).

Depot Repairable Asset/Component: An item of a durable nature which, when unserviceable, normally can be economically restored to a serviceable condition through regular repair procedures. An item which, when beyond the repair capability of lower-level (organizational/intermediate) maintenance, is returned to

the depot, which possesses more extensive repair facilities (1:E-27).

Depot Source of Repair (DSOR): An organic or contract activity designated as the source to provide depot maintenance of equipment (1:3).

Inventory Control Point (ICP): An organizational unit or activity within a DoD supply system which is assigned the primary responsibility for the material management of a group of items, either for a particular service or for the Defense Department as a whole (1:E-27).

Joint Depot Maintenance Analysis Group (JDMAG): A joint service group established by the JPCG-DMI as an organization to provide technical support in depot maintenance long-range planning, initiatives, policy assessment, interservice potential and implementation tracking of approved depot maintenance interservice assignments (1:1).

Joint Logistics Commanders (JLC): A group comprised of the Commanding General, U.S. Army Materiel Command (AMC); the Commander Air Force Materiel Command; and Chief of Naval Operations (OP-04), with the Marine Corps Deputy Chief of Staff for Installation and Logistics as an invited guest (1:2).

Joint Policy Coordinating Group for Depot Maintenance Interservicing (JPCG-DMI): A designated Group of flag-level representatives from the four Services chartered by the JLC to assure adequate direction, planning, coordination, and control of the implementation of depot maintenance interservice program actions; to assure consistent emphasis and interpretation of established interservice policy; and to recommend appropriate changes (1:2).

Maintenance Interservice Support Management Office(s) (MISMO): Office within the Service logistics staffs headquartered at NAVAIR, USAMC, AFMC, and Commander Marine Corps Logistics Bases responsible for the formulation of policy, guidance, and procedures for and provides the management, implementation, and operation of the DMI Program. May also denote the identity of the principal member of that office (1:2).

Maintenance Interservice Support Office (MISO): Offices established at Commander Marine Corps Logistics Bases and Naval Systems Commands headquarters and at USAMC subordinate commands and AFMC product and logistics centers for dissemination and implementation of policy, responsibilities and procedures at the subordinate command/organizational level. May also denote a member of that office. (1:2)

Organic Maintenance: Maintenance performed by a Military Department under military control utilizing Government-owned or controlled facilities, tools, test equipment, spares, repair parts, and military or Government civilian personnel. Depot-level maintenance by one Service for another is considered organic within the DoD (1:E-28).

Program Management Office (PMO): The organization comprised of technical and business management and administrative personnel assigned full-time to a system program director. The office may be augmented with additional personnel from participating organizations.

Semi-Structured Interview: An interview structured in such a manner as to allow the respondent the ability to answer question in an open-ended manner as opposed to restrictive responses (i.e. yes, no, true, false, number seven, etc.).

Source of Repair (SOR): An organic, interservice, or commercial industrial activity assigned to perform depot-level maintenance on weapon systems, systems, subsystems, major end-items, or components requiring such maintenance (1:E-29).

Subassembly: Two or more parts forming a portion of an assembly or a unit replaceable as a whole but having parts which are individually replaceable. The distinction between

an assembly and a subassembly is not always exact; an assembly in one instance may be a subassembly when it forms a portion of another assembly (1:E-30).

Support Equipment (SE): All equipment(including associated software) required to make and/or keep an item or its components operational in its intended environment. This includes all equipment required to install, inspect, test, adjust, calibrate, appraise, gauge, measure, assemble, disassemble, handle, transport, safeguard, store, actuate, service, repair, overhaul, maintain, or operate the system, subsystem, end item, or component, and SE for SE. Support Equipment may be categorized as common(general purpose) or peculiar (special purpose) (1:E-30).

Weapon System: A final combination of subsystems, components, parts, and material which is utilized in combat, either offensively or defensively, to destroy, injure, defeat, or threaten the enemy (1:E-30).

Appendix B: Dictionary of Acronyms

AFLC: Air Force Logistics Command
AFMC: Air Force Material Command
AFSC: Air Force Systems Command
AFSCs: Air Force Specialty Codes
AMRAAM: Advanced Medium Range Air-to-Air Missile
CASS: Consolidated Automated Support System.
CDR: Critical Design Review
CSNAS: Computer Supported Network Analysis System
DMAWG: Depot Maintenance Activation Working Group
DMI: Depot Maintenance Interservicing
DMISA: Depot Maintenance Interservice Support Agreement
DoD: Department of Defense
DODI: Department of Defense Instruction
DPME: Depot Plant Maintenance Equipment
EMD: Engineering and Manufacturing Development
FCA: Functional Configuration Audit
GAO: General Accounting Office
GPS: Global Positioning System
IACCR: Industrial Activity Capability and Capacity Response
ICLS: Interim Contractor Logistics Support
ICP: Inventory Control Point
ICS: Interim Contractor Support
IDM: Improved Data Modem
IFF: Identification, friend or foe
IFTE: Integrated Family of Test Equipment

IWSM: Integrated Weapon System Management
JDMAG: Joint Depot Maintenance Analysis Group
JPCG-DMI: Joint Policy Coordinating Group for Depot
Maintenance Interservicing
JTIDS: Joint Tactical Information Distribution System
LSA: Logistics Support Analysis
MATE: Modular Automatic Test Equipment
MISMO: Maintenance Interservice Support Management Office
MISO: Maintenance Interservice Support Office
OBIGGS: On-Board Inert Gas Generating System
OBOGGS: On-Board Oxygen Gas Generating System
PCE: Professional Continuing Education
PMO: Program Management Office
SE: Support Equipment
SERD: Support Equipment Recommendation Data
SOR: Source of Repair
SPO: System Program Office
TRD: Test Requirements Document

Appendix C: Sample JLC Forms Used in the DMI Study Process

JDMAG CONTROL NUMBER			
DMI CANDIDATE INFORMATION			
1 ORIGINATING COMMAND/CONTROL NUMBER	2 SYSTEM/EQUIPMENT/ITEM NOMENCLATURE	3 T/M/S DESIGNATION	
4 MANUFACTURER / LOCATION / CAGE CODE	5 SYSTEM/EQUIPMENT/ITEM APPLICATION	6 INVENTORY	7 DEPOT SUPPORT DATE
8 OTHER USER(S)	9 SIMILAR NOMENCLATURE AND TYPE DESIGNATION	10 SUPERSEDED NOMENCLATURE AND TYPE DESIGNATION	
11 FUNCTIONAL DESCRIPTION			
12 NEW/UNIQUE DEPOT SUPPORT EQUIPMENT REQUIREMENTS			
13			
CONTACT POINTS			
TITLE	NAME	LOCATION	PHONE NUMBER
ITEM/SYSTEM/ LOGISTICS MANAGER			
ACQUISITION MANAGER			
MAINTENANCE INTERSERVICE SUPPORT OFFICER			
WEAPON SYSTEM VENDOR			
SYSTEM/EQUIPMENT VENDOR			
OTHER			
14 REMARKS			
<input type="checkbox"/> NEW <input type="checkbox"/> POSTURED A. PROGRAM/TECHNICAL INFORMATION PACKAGE (JLC FORMS 28-32) AVAILABILITY DATE B. DMI STUDY SUPPORTING TECHNICAL DOCUMENTATION AVAILABILITY DATE C. DEPOT SOURCE OF REPAIR DECISION REQUIREMENT DATE			
15 DATE	16 NAME/TITLE OF ORIGINATOR	17 LOCATION/ADDRESS	18 OFFICE SYMBOL/ CODE
			19 PHONE NUMBER

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INDUSTRIAL ACTIVITY CAPABILITY AND CAPACITY RESPONSE		1. JOMAG CONTROL NUMBER	
		2. RESPONDING ACTIVITY CONTROL NUMBER	
3. RESPONDING SERVICE		4. RESPONDING ACTIVITY	
5. DATE OF RESPONSE SUBMITTAL			
6. RESPONDING ACTIVITY CONTACT		7. CODE/SYMBOL	8. TELEPHONE NUMBER
9. SYSTEM/EQUIPMENT/ITEM NOMENCLATURE		10. T/M/S DESIGNATION	
11. NATIONAL STOCK NUMBER	12. PART NUMBER	13. CAGE	14. APPLICATION
15. RESPONDING ACTIVITY REMARKS			
16. JOMAG REMARKS			
17. JOMAG PROJECT OFFICER		18. TELEPHONE NUMBER	

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SUMMARY CAPABILITY/COSTS					
SYSTEM/EQUIPMENT ITEM NOMENCLATURE			JDMAC CONTROL NUMBER		RESPONDING ACT CONT NO
COST CATEGORY	AVAILABLE COST		ADDITIONAL COST		
	OWN SERVICE WORKLOAD	OTHER SERVICE WORKLOAD	OWN SERVICE WORKLOAD	OTHER SERVICE WORKLOAD	
1. EQUIPMENT					
A. COMMON SUPPORT (JLC FORM 35)					
B. PECULIAR SUPPORT (JLC FORM 36)					
C. INDUSTRIAL/ADD'L PLANT (JLC FORM 37)					
SUBTOTAL					
2. FACILITIES (JLC FORM 38)					
A. REPAIR					
B. EQUIPMENT INSTALLED					
C. ALTERATION					
D. NEW CONSTRUCTION					
			SUBTOTAL		
3. FORMAL TRAINING	ADD'L REQUIRED		UNIT TRAINING COST		
	OWN WELD	OTH WELD			
A. DIRECT LABOR PERSONNEL					
			SUBTOTAL		
			ADDITIONAL COST		
			OWN SERVICE WORKLOAD	OTHER SERVICE WORKLOAD	
			TOTAL		
REMARKS					

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	PAGE	OF	PAGES
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3. City	3	1	1
4. State	4	1	1
5. Zip	5	1	1
6. Title	6	1	1
7. Date	7	1	1
8. Subject	8	1	1
9. Remarks	9	1	1
10. Signature	10	1	1
11. Initials	11	1	1
12. Date	12	1	1
13. Subject	13	1	1
14. Remarks	14	1	1
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MANHOUR REQUIREMENTS/WORKLOAD PROJECTION SUMMARY (PEACETIME)

1. SYSTEM/EQUIPMENT/ITEM NOMENCLATURE		2. RESPONSIBLE SERVICE		3. DUTY/ACTIVITY		4. DUTY/ACTIVITY		5. DUTY/ACTIVITY		6. DUTY/ACTIVITY		7. DUTY/ACTIVITY		8. DUTY/ACTIVITY		9. DUTY/ACTIVITY	
4. TIME SIGNATURE		5. NATIONAL STOCK NUMBER		6. PART NUMBER		7. RESPONSIBILITY		8. RESPONSIBILITY		9. RESPONSIBILITY		10. RESPONSIBILITY		11. RESPONSIBILITY		12. RESPONSIBILITY	
A		B		C		D		E		F		G		H		I	
PROJECTED SERVICE WORKLOAD		FY		FY		FY		FY		FY		FY		FY		FY	
ARMY																	
NAVY																	
AIR FORCE																	
MARINE CORPS																	
TOTAL																	

REMARKS

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PROJECTED WORKLOAD (MOBILIZATION)															
1 SYSTEM/EQUIPMENT/ITEM NOMENCLATURE		2 TIME DESIGNATION		3 NATIONAL STOCK NUMBER		4 PART NUMBER		5 JOMAG CONTROL NO.							
6 ITEM NUMBER	7 NATIONAL STOCK NUMBER/ PART NUMBER	8 NOMENCLATURE	9	M + 1	M + 2	M + 3	M + 4	M + 5	M + 6	M + 7	M + 8	M + 9	M + 10	M + 11	M + 12
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Vita 1

Captain Robert N. McGarry was born in Halifax, Massachusetts in 1955. He graduated from Silver Lake Regional High School in 1973. That same year he enlisted in the Air Force and after attending basic training he attended technical school at Lowry AFB to become an Inventory Management Specialist. In this career field he had assignments at Reese AFB, TX, King Salmon AFS, AK, and Castle AFB, CA. While assigned at Castle AFB, he completed his Bachelor of Arts degree in Psychology. An acceptance to Officer Training School resulted in his receiving his commission in April of 1981. He then attended technical school and Emergency War Order training to become a Titan II Missile Combat Crew member. He was then assigned to McConnell AFB, KS where he served as a Missile Combat Crew Deputy and Commander. In 1986, Captain McGarry cross-trained into Missile Maintenance by attending technical school at Chanute AFB, IL. After training he was assigned to Malmstrom AFB, MT. He accomplished Squadron Officers School by both correspondence and in residence in 1986. He was assigned as Chief, Job Control Branch at Malmstrom AFB immediately prior to entering the School of Systems and Logistics, Air Force Institute of Technology, in 1991.

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Vita 2

Captain Gregory K. Owens was born on 20 March 1950 in Buffalo, New York. He graduated from Lake Shore Central High School in Angola, New York in 1968 and enlisted in the Air Force in October of the same year. He attended aircraft maintenance technical training school at Shepard AFB Texas and served in a variety of maintenance positions over the next 14 years, including two combat tours in Southeast Asia. He earned a Bachelor of Science degree in Industrial Technology with honors from Southern Illinois University in 1982 while assigned at Plattsburg AFB, New York. He entered Officer Training School in July 1982, and received his commission in October 1982. He then attended the aircraft maintenance officer course at Chanute AFB, IL, and was an honor graduate. His first commissioned assignment was assistant officer-in-charge, 58th Aircraft Maintenance Unit, Eglin AFB, FL where he managed 24 F-15 aircraft and supervised over 275 personnel. In June 1985, he was assigned to the San Antonio Air Logistics Center, Kelly AFB, TX as the F-15 Automatic Test Equipment logistics plans-programs officer. He was selected for special duty in June 1988, as an Air Force ROTC instructor at Miami University in Oxford, OH immediately prior to entering the School of Systems and Logistics, Air Force Institute of Technology, in 1991.

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6. AUTHOR(S) Robert N. McGarry, Captain, USAF Gregory K. Owens, Captain, USAF				
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